

CLAIMS

1. A transducer for continuously and noninvasively measuring blood pressure
5 in a blood vessel (52) *characterized by*
having integrated into a single semiconductor chip (41):
- an array (20, 20b) of transducer or sensor elements (10, 10b),
- means (21) for reading out data from said sensor elements (10, 10b),
and
10 - means (22, 23, 24) for converting said data into a transmittable form.
2. The blood pressure transducer according to claim 1, *further including*
interface means (44) for transmitting said data from said chip (41) to an
external computer (45).
- 15 3. The blood pressure transducer according to claim 1 or 2, *wherein*
the semiconductor chip is a CMOS chip.
4. The blood pressure transducer according to claim 1, *wherein*
20 each sensor element (10) comprises a fluid-filled capacitive sensor having
a flexible electrode or membrane (11) and a rigid electrode (13) and a fluid
gap (12) connected to an opening (15).
5. The blood pressure transducer according to claim 1, *wherein*
25 each sensor element (10b) comprises a resistive sensor having strain sen-
sitive resistors on a flexible structure of cross-linked beams (16) a flexible
protective membrane (11b) and a fluid gap (12b) connected to openings
(15).

6. The blood pressure transducer according to any preceding claim, *wherein* the sensor elements (10, 10b) are arranged in a square array (20, 20b).
7. The blood pressure transducer according to claim 6, *wherein*
5 the array (20, 20b) comprises at least 2x2 sensor elements (10, 10b), preferably 4x4 sensor elements (10, 10b).
8. The blood pressure transducer according to claim 4 and 6, *wherein*
10 the array (20) comprises 2x2 sensor elements (10) arranged with adjacent openings (15) located in the center of said array (20).
9. The blood pressure transducer according to claim 7 or 8, *wherein* the array (20, 20b) of sensor elements (10, 10b) is placed close to one end of the semiconductor chip (41).
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10. The blood pressure transducer according to an preceding claim, *wherein* the semiconductor chip (41) is part of a sensing device (40) which further includes a power source.
- 20 11. The blood pressure transducer according to claims 2 and 10, *wherein* the interface means (44) for transmitting the data from said chip (41) to an external computer (45) is a wireless transmission means.
- 25 12. A system for continuously and noninvasively measuring and monitoring blood pressure in a blood vessel (52), *characterized by* a sensing device (40) including a single semiconductor chip (41) having integrated

- an array (20, 20b) of sensor elements (10, 10b) overlying said blood vessel,
 - means (21) for reading out data from said sensor elements (10, 10b),
 - means (22, 23, 24) for converting said data, and
 - 5 - means (44) for interfacing with external evaluation means (45).
13. The measuring and monitoring system according to claim 12,
further including
a power source on the sensing device (40) and wireless means for
10 interfacing with the external evaluation means (45).
14. A method for making a transducer (41) for continuously and noninvasively
measuring and monitoring blood pressure in a blood vessel (52)
including
15 fabricating on a single semiconductor chip (41) with conventional
semiconductor technology, preferably CMOS technology,
- an array (20, 20b) of sensor elements (10, 10b),
 - means (22, 23, 24) for converting, and
 - means (44) for transmitting said data to external evaluation means
20 (45).
15. A method for using a transducer (41) according to any of the claims 1 to
11 or a system according to claim 12 or 13 for continuously and noninva-
sively measuring and monitoring blood pressure in a blood vessel (52)
25 *characterized by*
- extracting directional information from said continuous blood pressure
measurement data to locate arteries and/or veins, and/or
 - extracting characteristic signal features from said continuous blood
pressure measurement data to differentiate between arteries and
30 veins.

16. A method for using a transducer (41) according to any of the claims 1 to 11 or a system according to claim 12 or 13 for continuously and noninvasively measuring and monitoring blood pressure in a blood vessel (52)

5 *characterized by*

- producing a map pattern of said continuous blood pressure measurement data to identify abrupt features, in particular blockages due to calcification inside arteries and veins.